

REMARKS

This amendment and response are submitted together with a Request for Continued Examination. In the Final Office Action dated October 26, 2007 and subsequent Advisory Action dated January 4, 2008, the Examiner:

rejected claims 1-31 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement;

rejected claim 19 under 35 U.S.C. § 112, second paragraph, as indefinite;

rejected claims 1-5, 9-11, 13-14 and 16-18 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication No. 2004/0011484 to Saviharju et al. in view of WIPO Publication WO 93/11297 to Kuusio et al. and U.S. Patent No. 5,226,927 to Rundstrom as evidenced by U.S. Patent No. 3,607,117 to Shaw et al. and U.S. Patent No. 4,312,702 to Tomlinson II;

rejected claims 6-8, 14-15 and 19-31 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of U.S. Patent No. 4,627,173 to O'Hagan et al.; and

rejected claim 12 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of U.S. Patent No. 5,103,743 to Berg.

Applicants respectfully traverse these rejections below. The current amendment cancels claims 5 and 10-12 and adds new claims 32-43, leaving claims 1-4, 6-9 and 13-43 pending upon entrance of the current amendment.

Claims 1-31 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement based on the added recitation to independent claims 1, 9 and 19 that the fuel gas is to be fed substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. The Examiner asserts that the Specification does not disclose the added recitation in such a way as to reasonably convey to one skilled in the art that the Applicants had possession of the claimed invention. Applicants respectfully disagree. Specifically, "[i]t is an object of the present invention to ... provide especially for new, but also for old, pulp mills a suitable

option that enables all the bark and other wood-derived fuel produced at the mill and, when necessary, brought from the outside to be exploited effectively in energy production.” (Specification, paragraph [0016]). To achieve this boost in energy production, “a biogenic fuel is gasified and burned in direct contact with the burning of concentrated liquor according to the Tomlinson process in a soda recovery boiler.” (Specification, paragraph [0019]). Therefore, since the present invention is concerned with increasing energy production by burning the biogenic fuel gas together with the concentrated liquor according to the Tomlinson process, it should be understood by those skilled in the art that the biogenic fuel gas is fed substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Otherwise, the present invention’s exploitation of energy production would not be achieved. In support of this, Applicants state that “[a]ccording to the present invention it is therefore advantageous to direct at least 40% of the gas to the recovery boiler” because “[i]f approximately 55% of the above-mentioned gas is directed to the soda recovery boiler for burning, and the increasing steam is directed to the condensation part of the turbine, the excess electricity further increases by approximately 10MW.” (Specification, paragraph [0032]).

Applicants further support substantially continuously feeding the biogenic fuel gas by stating that “[T]he greatest improvement is obtained when the heavy fuel oil of the lime sludge reburning kiln is replaced in accordance with the process with fuel gas (approx. 45%) and the remainder is burned in the soda recovery boiler (approx. 55%). In a modern pulp mill this means annually the replacement of approximately 20,000 tons with fuel gas. At the Annual level this means approximately 17,500 tons less of detrimental carbon dioxide emissions, and when natural gas is replaced, it means approximately 12,500 tons a year.” (Specification, paragraph [0031]). Therefore, Applicants respectfully submit that one skilled in the art should understand that the present invention contemplates feeding the biogenic fuel gas substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

Thus, the Specification adequately discloses the recitation that the fuel gas is fed substantially continuously during the burning of the concentrated liquor in

the soda recovery boiler. Accordingly, Applicants respectfully request that the rejection of claims 1-31 under 35 U.S.C. § 112, first paragraph, be withdrawn.

Claim 19 was rejected under 35 U.S.C. § 112, second paragraph, as indefinite, for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully submit that amended claim 19 is not indefinite. Amended claim 19 is directed to an apparatus for producing, from wood bark, a biogenic fuel gas to be fed into a recovery boiler, the apparatus comprising a bark-drying unit and a dried-bark gasifier. Specifically, the bark-drying unit has feed means for the wood bark, is adapted to utilize waste heat of the pulp mill for drying, and has outlet means for the dried bark. The dried-bark gasifier produces fuel from the dried bark and has feed means for bark and outlet means for fuel gas, wherein the feed means of the gasifier are connected to the outlet means of the drying unit and the gas outlet means are connected to the feed unit of the recovery boiler. Accordingly, Applicants respectfully submit that amended claim 19 is not indefinite and respectfully request that the rejection of claim 19 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claims 1-5, 9-11, 13-14 and 16-18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom as evidenced by Shaw and Tomlinson II. A rejection under § 103 is improper unless the Examiner established a *prima facie* case of obviousness. A *prima facie* case of obviousness is not established unless the prior art references, alone or in combination, teach or suggest each and every claim recitation.

Applicants' amended claim 1 recites a process for production of energy in a pulp mill, according to which process a waste liquor of a cellulose pulp digestion liquor is concentrated, and this concentrated liquor is burned in a soda recovery boiler in the presence of biogenic fuels, thermal energy of flue gases obtained from the burning being recovered, wherein at least part of the biogenic fuel used is bark which is produced in the pulp mill in a debarking process, and wherein essentially the entire bark amount produced in said debarking process is dried to a moisture content below 30% using waste heat of the pulp mill,

whereafter at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

Applicants' amended claim 9 recites a process for producing energy in a sulfate pulp mill, according to which process wood material used for pulp production is in part digested in cooking liquor to separate fibers from each other, the digested wood material is extracted as black liquor from the separated fibers, the black liquor is concentrated by evaporation, and the concentrated liquor is burned in a soda recovery boiler to regenerate cooking chemicals and to produce heat and electricity by using biogenic fuels, wherein bark is produced in a debarking process in the sulfate pulp mill, essentially the entire bark amount is dried using waste heat of the pulp mill and at least part of the bark is brought into a gaseous form, formed ash is separated, a significant proportion of the gas is burned in the same boiler, equipped with heat recovery, as the concentrated liquor, and the gas is burned substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

Neither Saviharju nor Kuusio nor Rundstrom nor Shaw nor Tomlinson II, nor any combination thereof, teaches or suggests each and every recitation of Applicants' amended claims 1 and 9.

For instance, Saviharju does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Instead, Saviharju teaches that "[d]ried wood fuel, such as bark, is supplied through a line 12 to the gasification stage 10," and that "gas generated in the gasifier flow through a line 44 to the superheating boiler." (Saviharju, paragraph [0021]). Amended claims 1 and 9 of the present invention eliminate the need for a separate bark boiler by feeding the fuel gas, created by gasifying excess wood from the mill, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Saviharju, which teaches the use of a separate superheating boiler to increase power yield at a pulp mill without corrosion problems (Saviharju, paragraph [0007]-[0009]), does not teach or suggest the elimination of a separate bark boiler.

Kuusio does not add to the teachings of Saviharju, at least in that Kuusio also does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Instead, Kuusio teaches gasifying a portion of the waste liquor and burning the gasified waste liquor in a superheated boiler. (See, e.g., Kuusio, p. 6, lines 1-22.) The gasification of waste *liquor* does not teach or suggest the gasified bark of Applicants' amended claims 1 and 9. While Kuusio does teach that the waste liquor gas can be used as a *starting* fuel in the waste liquor recovery boiler (Kuusio, p. 10, line 37 – p. 11, line 1; emphasis added.), use of the gasified waste liquor as a *starting* fuel does not teach or suggest substantially continuous burning of gasified bark, as recited in amended claims 1 and 9 of the present invention. Additionally, amended claims 1 and 9 eliminate the need for a separate bark boiler by feeding the fuel gas, created by gasifying excess wood from the mill, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. In clear contrast with amended claims 1 and 9, Kuusio teaches burning the waste liquor gas in a superheated boiler or a separate bark boiler. (Kuusio, page 13, lines 24-26).

Rundstrom does not add to the teachings of Saviharju and Kuusio, at least in that Rundstrom also does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. In fact, Rundstrom does not appear to teach anything concerning the fuel supplied to a soda recovery boiler and, thus, does not disclose, teach or suggest anything about the feeding of a gasified bark fuel into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

Shaw does not add to the teachings of Saviharju, Kuusio and Rundstrom, in that Shaw also does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. First, Shaw does not appear to teach or suggest anything with regard to the use of gasified bark as a fuel gas. Instead, Shaw

teaches the use of an auxiliary gas such as fuel oil. (Shaw, col. 3, lines 46-48). Second, Shaw does not teach that the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Instead, Shaw teaches that, "...under normal conditions, black liquor is the only fuel supplied to the boiler 10." (Shaw, col. 3, lines 42-43). Shaw further states that, auxiliary fuel may be used during startup, but after the gas has initiated combustion of the black liquor, the gas supply is shut off. (Shaw, col. 3, lines 43-50). Shaw does teach that "[i]n the event the demand for steam exceeds that which can be supplied by burning the available black liquor, auxiliary fuel, such as secondary gas or fuel oil, is supplied to the nozzles 54..." (Shaw, col. 3, lines 54-56). However, supplying fuel oil in the event that the demand for steam exceeds that which can be supplied by burning the available black liquor does not teach or suggest supplying gasified bark into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler, as recited by amended claims 1 and 9.

Tomlinson II does not add to the teachings of Saviharju, Kuusio, Rundstrom and Shaw, in that Tomlinson II also does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Instead, Tomlinson II teaches that, "...it is possible to maintain satisfactory operating temperatures throughout the furnace over a considerable range of production rates by adjusting the air supply to correspond to the rate of residual liquor production, if necessary adding oil or gas as an auxiliary fuel." (Tomlinson II, col. 6, lines 11-16). The Examiner incorrectly states that this indicates that gas is burned substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. (Office Action, pg. 8). However, the use of the phrase "if necessary" teaches that the gas is not to be supplied substantially continuously, but only when the temperature cannot be regulated with the air supply alone. Additionally, Tomlinson II teaches away from using a gasified bark fuel because, according to Tomlinson II, gas does not distribute itself throughout the bed of the boiler. (Tomlinson II, col. 5-6, lines 67-2). Instead, Tomlinson II teaches the use

of a particulate auxiliary solid fuel. (Tomlinson II, abstract). Therefore, Tomlinson II does not teach or suggest the feeding of a gasified bark fuel into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

Thus, the combination of Saviharju, Kuusio, Rundstrom, Shaw and Tomlinson II does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Accordingly, neither Saviharju nor Kuusio nor Rundstrom nor Shaw nor Tomlinson II, nor the combination thereof, teaches or suggests each and every recitation of Applicants' amended claims 1 and 9. Therefore, Applicants respectfully submit that the rejection of claims 1 and 9 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom as evidenced by Shaw and Tomlinson II is improper for at least these reasons, and should be withdrawn.

Claims 2-4, 13-14 and 16-18 depend directly from amended claims 1 and 9 and include additional recitations thereto. Accordingly, Applicants respectfully submit that the rejection of claims 2-4, 13-14 and 16-18 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom as evidenced by Shaw and Tomlinson II is improper for at least the reasons stated in connection with amended claims 1 and 9, and should be withdrawn.

Additionally, the current amendment cancels dependent claims 5, 10 and 11.

Therefore, rejection of claims 1-5, 9-11, 13-14 and 16-18 under 35 U.S.C. § 103(a) should be withdrawn and claims 1-5, 9, 13-14 and 16-18 passed to issue.

Claims 6-8, 14-15 and 19-31 were rejected under 35 U.S.C § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of O'Hagan.

Claims 6-8, 14-15 and 28-31 all depend, directly or indirectly, from Applicants' independent claims 1 and 9 and include additional recitations thereto. As stated in connection with amended claims 1 and 9, neither Saviharju

nor Kuusio nor Rundstrom, nor the combination thereof, teaches or suggests each and every recitation of amended claims 1 and 9.

Applicants respectfully submit that O'Hagan does not remedy the deficiencies of Saviharju, Kuusio and Rundstrom as applied to amended claims 1 and 9, at least in that O'Hagan also does not teach or suggest that at least part of the dried bark is gasified to produce a fuel gas that is fed, at least in part, into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Instead, O'Hagan is concerned solely with the drying of wet wood waste (O'Hagan, col. 1, lines 6-7) and does not teach anything about gasifying dried bark to produce fuel gas.

Therefore, the combination of Saviharju, Kuusio, Rundstrom and O'Hagan does not teach or suggest each and every recitation of Applicants' independent amended claims 1 and 9.

Accordingly, Applicants respectfully submit that the rejection of dependent claims 6-8, 14-15 and 28-31 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of O'Hagan, is improper for at least this reason, and should be withdrawn.

Applicants' amended claim 19 recites an apparatus for producing, from wood bark, a biogenic fuel gas to be fed into a recovery boiler of a pulp mill, the apparatus being connected to a feed unit of the recovery boiler, wherein it comprises as a combination a bark-drying unit having feed means for the wood bark to be dried and outlet means for the dried bark, the bark-drying unit being adapted to utilize waste heat of the pulp mill for drying, and a dried-bark gasifier for producing fuel gas from the dried bark, the apparatus having feed means for bark and outlet means for fuel gas, the feed means of the gasifier being connected to the outlet means of the drying unit and the gas outlet means being connected to the feed unit of the recovery boiler to feed into the boiler the fuel gas produced from the dried bark by gasification substantially continuously during operation of the boiler.

Saviharju does not teach or suggest each and every recitation of Applicants' amended claim 19. For instance, Saviharju does not teach or suggest a dried-bark gasifier for producing fuel gas from the dried bark having outlet means connected to the feed unit of the recovery boiler to feed into the boiler the

fuel gas produced from the dried bark by gasification substantially continuously during operation of the boiler. The apparatus of amended claim 19 of the present invention eliminates the need for a separate bark boiler by connecting the outlet means of the dried-bark gasifier to the feed unit of the recovery boiler so that the fuel gas from the dried-bark gasifier is fed into the soda recovery boiler substantially continuously during the burning of the concentrated liquor in the soda recovery boiler. Saviharju uses a separate superheating boiler for the gas produced from wood waste to increase power yield at a pulp mill without corrosion problems (Saviharju, paragraph [0007]-[0009]). Thus, Saviharju does not teach or suggest the elimination of a separate bark boiler.

Kuusio does not add to the teachings of Saviharju, at least in that Kuusio also does not teach or suggest a dried-bark gasifier for producing fuel gas from the dried bark having outlet means connected to the feed unit of the recovery boiler to feed into the boiler the fuel gas produced from the dried bark by gasification substantially continuously during operation of the boiler. Instead, like Saviharju, Kuusio teaches burning the waste liquor gas in a superheated boiler or a separate bark boiler. (Kuusio, page 13, lines 24-26).

Rundstrom does not add to the teachings of Saviharju and Kuusio, at least in that Rundstrom also does not teach or suggest a dried-bark gasifier for producing fuel gas from the dried bark having outlet means connected to the feed unit of the recovery boiler to feed into the boiler the fuel gas produced from the dried bark by gasification substantially continuously during operation of the boiler. Instead, Rundstrom does not appear to teach anything concerning an apparatus having a dried-bark gasifier connected to the feed unit of a recovery boiler.

O'Hagan does not add to the teachings of Saviharju, Kuusio and Rundstrom, at least in that O'Hagan also does not teach or suggest a dried-bark gasifier for producing fuel gas from the dried bark having outlet means connected to the feed unit of the recovery boiler to feed into the boiler the fuel gas produced from the dried bark by gasification substantially continuously during operation of the boiler. Instead, O'Hagan is concerned solely with the drying of wet wood waste (O'Hagan, col. 1, lines 6-7) and does not teach

anything about a dried-bark gasifier for producing fuel gas from the dried bark having outlet means connected to the feed unit of the recovery boiler.

Thus, the combination of Saviharju, Kuusio, Rundstrom and O'Hagan, does not teach or suggest each and every recitation of Applicants' amended claim 19. Accordingly, Applicants respectfully submit that the rejection of claim 19 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of O'Hagan, is improper and should be withdrawn.

Claims 20-27 depend, directly or indirectly, from amended claim 19 and include additional recitations thereto. Accordingly, Applicants respectfully submit that the rejection of claims 20-27 under 35 U.S.C § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of O'Hagan, is improper for at least the reasons stated in connection with claim 19, and should be withdrawn.

Claim 12 was rejected under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of Berg. The current amendment cancels dependent claim 12 from the application. Accordingly, Applicants respectfully request that the rejection of dependent claim 12 under 35 U.S.C. § 103(a) as unpatentable over Saviharju in view of Kuusio and Rundstrom, and further in view of Berg be withdrawn.

Having traversed each and every claim rejection, Applicants respectfully request that the rejections of claims 1-31 be withdrawn, and claims 1-4, 6-9 and 13-43 be passed to issue.

Applicants respectfully submit that nothing in the current amendment constitutes new matter.

Applicants hereby petition for a two-month extension of time for filing this response.

Application No.: 10/522,051
Advisory Action dated: 1/4/2008
Response to Advisory Action dated: 5/28/2008

Applicants hereby authorize the charge of \$460.00 to deposit account 13-0235 to cover the fee for the two-month extension of time and \$400.00 to cover the fee for eight additional claims in excess of twenty.

Applicants believe that no additional fees are due in connection with this amendment and response. If any additional fees are deemed necessary, please charge them to deposit account 13-0235.

Respectfully submitted,

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